

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	T. Tamura	NDS 108,455 (2007)	30-Sep-2006

$Q(\beta^-) = -1.01 \times 10^4$ *syst*; $S(n) = 1.194 \times 10^4$ *15*; $S(p) = 4.80 \times 10^3$ *4*; $Q(\alpha) = 1.05 \times 10^3$ *3* [2012Wa38](#)

Note: Current evaluation has used the following Q record -10070 SY11.94E+3144800 301045 30 [2003Au03](#).

$\Delta Q_\beta = 300$ keV from atomic mass systematics ([2003Au03](#)).

 ^{122}Ba LevelsCross Reference (XREF) Flags

- A (HI,xn γ)
 B ^{122}La ε decay
 C ^{123}Ce εp decay

E(level)	J^π	$T_{1/2}$	XREF	Comments
0.0 [#]	0 ⁺	1.95 min <i>15</i>	ABC	$\% \varepsilon + \% \beta^+ = 100$ $T_{1/2}$: from decay curve of Cs K x ray (1978Bo32). Other: 2.0 min <i>3</i> (1977Bo02 , 1976BoYK). Nuclear rms charge radius = 4.8154 fm <i>53</i> (2004An14).
195.90 [#] <i>20</i>	2 ⁺	297 ps <i>27</i>	ABC	$B(E2)^\uparrow = 2.81$ <i>28</i> J^π : From $\gamma(\theta)$ (1974Co36) and RUL. $T_{1/2}$: from $\beta\gamma(t)$ in ^{122}La ε decay (1992Mo13). $B(E2)$ from $T_{1/2}$.
568.6 [#] <i>3</i>	(4 ⁺)		ABC	
618.2 ^d <i>4</i>	(2 ⁺)		A	
939.5 <i>3</i>			B	
1081.6 [#] <i>3</i>	(6 ⁺)		A C	
1167.8 ^d <i>4</i>	(3 ⁺)		AB	
1205.2 ^d <i>4</i>	(4 ⁺)		A	
1271.6? <i>11</i>			AB	
1604.4 ^d <i>4</i>	(5 ⁺)		A	
1701.8 [#] <i>4</i>	(8 ⁺)		A	
1883.0 ^{&} <i>4</i>	(5 ⁻)		A	
2141.7 ^d <i>4</i>	(7 ⁺)		A	
2204.9 ^{&} <i>4</i>	(7 ⁻)		A	
2298.3 [@] <i>4</i>	(6 ⁻)		A	
2395.7 [#] <i>4</i>	(10 ⁺)		A	
2640.4 ^{&} <i>4</i>	(9 ⁻)		A	
2663.8 [@] <i>4</i>	(8 ⁻)		A	
2693.7 ^a <i>9</i>	(6 ⁻)		A	
2705.2 <i>7</i>	(6 ⁻)		A	
2713.6 <i>7</i>	(7 ⁻)		A	
2766.5 ^d <i>4</i>	(9 ⁺)		A	
2804.9 ^b <i>8</i>	(7 ⁻)		A	
2955.8 ^a <i>10</i>	(8 ⁻)		A	
3117.8 [@] <i>11</i>	(10 ⁻)		A	
3121.5 [#] <i>5</i>	(12 ⁺)		A	
3154.9 ^b <i>11</i>	(9 ⁻)		A	

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Adopted Levels, Gammas (continued) ^{122}Ba Levels (continued)

E(level)	J^{π}	XREF	Comments
3181.0 ^{&} 4	(11 ⁻)	A	
3392.6 ^a 12	(10 ⁻)	A	
3452.3 ^d 5	(11 ⁺)	A	
3669.4 ^b 13	(11 ⁻)	A	
3700.8 [@] 15	(12 ⁻)	A	
3827.4 ^{&} 6	(13 ⁻)	A	
3835.9 [#] 5	(14 ⁺)	A	
3981.4 ^a 13	(12 ⁻)	A	
4325.4 ^b 14	(13 ⁻)	A	
4396.8 [@] 18	(14 ⁻)	A	
4571.8 [#] 6	(16 ⁺)	A	
4572.2 ^{&} 7	(15 ⁻)	A	
4697.3 ^a 15	(14 ⁻)	A	
5096.6 ^b 15	(15 ⁻)	A	
5180.8 [@] 21	(16 ⁻)	A	
5379.6 [#] 7	(18 ⁺)	A	
5397.1 ^{&} 8	(17 ⁻)	A	
5516.8 ^a 16	(16 ⁻)	A	
5963.0 ^b 17	(17 ⁻)	A	
6034.8 [@] 23	(18 ⁻)	A	
6269.4 [#] 8	(20 ⁺)	A	
6284.9 ^{&} 9	(19 ⁻)	A	
6424.4 ^a 18	(18 ⁻)	A	
6910.0 ^b 20	(19 ⁻)	A	
6963.8 [@] 25	(20 ⁻)	A	
7236.9 ^{&} 14	(21 ⁻)	A	
7252.4 [#] 13	(22 ⁺)	A	
7408.4 ^a 20	(20 ⁻)	A	
7930.0 ^b 22	(21 ⁻)	A	
7984 [@] 3	(22 ⁻)	A	
8258.9 ^{&} 17	(23 ⁻)	A	
8328.4 [#] 17	(24 ⁺)	A	
8467.4 ^a 23	(22 ⁻)	A	
9033.0 ^b 24	(23 ⁻)	A	
9084 [@] 3	(24 ⁻)	A	
9361.9 ^{&} 20	(25 ⁻)	A	
9496.4 [#] 19	(26 ⁺)	A	
9612.4 ^a 25	(24 ⁻)	A	
10749.5 [#] 22	(28 ⁺)	A	
0+x ^{‡c} 1	J	A	Additional information 1.
x+267.0 ^c 8	J+1	A	
x+547.0 ^c 8	J+2	A	
x+835.0 ^c 10	J+3	A	
x+1118.9 ^c 11	J+4	A	
x+1405.2 ^c 12	J+5	A	

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Adopted Levels, Gammas (continued) ^{122}Ba Levels (continued)

E(level)	$J^\pi^\dagger$	XREF	E(level)	$J^\pi^\dagger$	XREF	E(level)	$J^\pi^\dagger$	XREF
x+1706.4 ^C 13	J+6	A	x+3129.8 ^C 15	J+10	A	x+4949.8 ^C 18	J+14	A
x+2026.6 ^C 13	J+7	A	x+3546.8 ^C 16	J+11	A	x+5463.8 ^C 20	J+15	A
x+2369.9 ^C 14	J+8	A	x+3991.8 ^C 17	J+12	A	x+6010.8 ^C 21	J+16	A
x+2736.8 ^C 15	J+9	A	x+4457.8 ^C 17	J+13	A			

[†] Spin and parity values are based on band structures in (HI,x γ).

[‡] >1082, since the level seems to feed 1082, 6⁺ level.

Band(A): Band 1, g.s. band, Crossing at $h^\circ\nu \approx 360$ keV due to alignment of a pair of $h_{11/2}$ protons.

@ Band(B): Band 2, configuration= $\pi(1/2[550])\pi(3/2[422] + 1/2[420])$, $\alpha=0$.

& Band(C): Band 3, configuration= $\pi(1/2[550])\pi(3/2[422] + 1/2[420])$, $\alpha=1$.

^a Band(D): Band 4, configuration= $\pi 9/2[404]\pi 1/2[550]$, $\alpha=0$.

^b Band(E): Band 5, configuration= $\pi 9/2[404]\pi 1/2[550]$, $\alpha=1$.

^c Band(F): Band 6, configuration= $\nu 7/2[523]\nu(5/2[402] \text{ and/or } 5/2[413])$.

^d Band(G): Band 7, γ band.

 $\gamma(^{122}\text{Ba})$

$E_i(\text{level})$	J^π_i	$E_\gamma^\dagger$	I_γ	E_f	J^π_f	Mult. @	δ° @	α° &	Comments
195.90	2 ⁺	195.9 2	100	0.0	0 ⁺	(E2)		0.185	B(E2)(W.u.)=155 15
568.6	(4 ⁺)	372.7 2	100	195.90	2 ⁺	Q(+O)	+0.02 6		
618.2?	(2 ⁺)	422.3 3	100	195.90	2 ⁺				
939.5		939.5 3	100	0.0	0 ⁺				
1081.6	(6 ⁺)	513.0 2	100	568.6	(4 ⁺)	(Q)			
1167.8	(3 ⁺)	(549.6)	<6.7	618.2?	(2 ⁺)				
		(599.4)	<14	568.6	(4 ⁺)				
		971.9 3	100	195.90	2 ⁺				
1205.2?	(4 ⁺)	587.0 2	100	618.2?	(2 ⁺)				
1271.6?		703 1	100	568.6	(4 ⁺)				
1604.4	(5 ⁺)	(399.4)	<4	1205.2?	(4 ⁺)				
		436.6 3	50.7 27	1167.8	(3 ⁺)				
		522.8 4	24.4 11	1081.6	(6 ⁺)				
		1035.9 3	100.0 19	568.6	(4 ⁺)	D+Q			δ : +3.7 +22-10 or +0.30 12.
1701.8	(8 ⁺)	620.2 2	100	1081.6	(6 ⁺)	Q(+O)	-0.02 5		
1883.0	(5 ⁻)	801.6 4	25.5 12	1081.6	(6 ⁺)				
		1314.3 2	100.0	568.6	(4 ⁺)	D(+Q)	-0.10 10		
2141.7	(7 ⁺)	(439.9)	<38.6	1701.8	(8 ⁺)				
		537.3 3	100.0 20	1604.4	(5 ⁺)				
		1060.1 3	78.8 20	1081.6	(6 ⁺)	D+Q	+0.6 +4-3		
2204.9	(7 ⁻)	322 ^a 1		1883.0	(5 ⁻)				
		504 ^a 1		1701.8	(8 ⁺)				
		1123.6 6	100.0	1081.6	(6 ⁺)	D+Q	-0.11 5		
2298.3	(6 ⁻)	93 1		2204.9	(7 ⁻)				
		415.2 2	100.0	1883.0	(5 ⁻)	D+Q	-0.9 +4-8		
		1216.7 2	35.0 12	1081.6	(6 ⁺)				
2395.7	(10 ⁺)	693.9 2	100	1701.8	(8 ⁺)	Q(+O)	-0.01 6		
2640.4	(9 ⁻)	435.6 2	40.2 7	2204.9	(7 ⁻)	Q(+O)	-0.01 14		
		938.5 2	100.0 7	1701.8	(8 ⁺)	D+Q	-0.12 5		
2663.8	(8 ⁻)	365.5 2	100.0 11	2298.3	(6 ⁻)	Q(+O)	-0.03 12		
		458.8 3	70.7 11	2204.9	(7 ⁻)				
		962.1 2	24.8 11	1701.8	(8 ⁺)	D(+Q)	+0.0 13		
2693.7	(6 ⁻)	992 ^a 1		1701.8	(8 ⁺)				

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Adopted Levels, Gammas (continued)

$\gamma(^{122}\text{Ba})$ (continued)							
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	I_γ	E_f	J_f^π	Mult. @	$\delta^\text{@}$
2693.7	(6 ⁻)	1612 <i>I</i>		1081.6	(6 ⁺)		
2705.2	(6 ⁻)	406 <i>I</i>		2298.3	(6 ⁻)		
		1625 <i>I</i>		1081.6	(6 ⁺)		
2713.6	(7 ⁻)	415 <i>I</i>		2298.3	(6 ⁻)		
		1012 <i>I</i>		1701.8	(8 ⁺)		
2766.5	(9 ⁺)	624.9 2	100 4	2141.7	(7 ⁺)	Q(+O)	0.0 3
		1064.6 4	42 4	1701.8	(8 ⁺)		
2804.9	(7 ⁻)	91 <i>I</i>		2713.6	(7 ⁻)		
		100 <i>I</i>		2705.2	(6 ⁻)		
		111 <i>I</i>		2693.7	(6 ⁻)		
2955.8	(8 ⁻)	151 <i>I</i>		2804.9	(7 ⁻)		
		262 <i>I</i>		2693.7	(6 ⁻)		
3117.8	(10 ⁻)	454 <i>I</i>	100	2663.8	(8 ⁻)		
3121.5	(12 ⁺)	725.8 2	100	2395.7	(10 ⁺)	Q(+O)	-0.08 8
3154.9	(9 ⁻)	199 <i>I</i>		2955.8	(8 ⁻)		
		350 <i>I</i>		2804.9	(7 ⁻)		
3181.0	(11 ⁻)	540.7 3	100.0 12	2640.4	(9 ⁻)		
		785.3 2	28.5 9	2395.7	(10 ⁺)	D	
3392.6	(10 ⁻)	238 <i>I</i>		3154.9	(9 ⁻)		
		437 <i>I</i>		2955.8	(8 ⁻)		
3452.3	(11 ⁺)	685.8 3	100	2766.5	(9 ⁺)		
3669.4	(11 ⁻)	277 <i>I</i>		3392.6	(10 ⁻)		
		514 <i>I</i>		3154.9	(9 ⁻)		
3700.8	(12 ⁻)	583 <i>I</i>	100	3117.8	(10 ⁻)		
3827.4	(13 ⁻)	646.4 4	100 [‡]	3181.0	(11 ⁻)		
3835.9	(14 ⁺)	714.4 2	100	3121.5	(12 ⁺)	Q(+O)	-0.09 12
3981.4	(12 ⁻)	312 <i>I</i>		3669.4	(11 ⁻)		
		589 <i>I</i>		3392.6	(10 ⁻)		
4325.4	(13 ⁻)	344 <i>I</i>		3981.4	(12 ⁻)		
		656 <i>I</i>		3669.4	(11 ⁻)		
4396.8	(14 ⁻)	696 <i>I</i>	100	3700.8	(12 ⁻)		
4571.8	(16 ⁺)	735.9 3	100	3835.9	(14 ⁺)	Q(+O)	-0.15 26
4572.2	(15 ⁻)	744.8 4	100 [‡]	3827.4	(13 ⁻)	(Q)	
4697.3	(14 ⁻)	372 <i>I</i>		4325.4	(13 ⁻)		
		716 <i>I</i>		3981.4	(12 ⁻)		
5096.6	(15 ⁻)	399 <i>I</i>		4697.3	(14 ⁻)		
		771 <i>I</i>		4325.4	(13 ⁻)		
5180.8	(16 ⁻)	784 <i>I</i>	100	4396.8	(14 ⁻)		
5379.6	(18 ⁺)	807.8 4	100	4571.8	(16 ⁺)		
5397.1	(17 ⁻)	824.8 4	100 [‡]	4572.2	(15 ⁻)		
5516.8	(16 ⁻)	420 <i>I</i>		5096.6	(15 ⁻)		
		820 <i>I</i>		4697.3	(14 ⁻)		
5963.0	(17 ⁻)	446 <i>I</i>		5516.8	(16 ⁻)		
		866 <i>I</i>		5096.6	(15 ⁻)		
6034.8	(18 ⁻)	854 <i>I</i>	100	5180.8	(16 ⁻)		
6269.4	(20 ⁺)	889.8 4	100	5379.6	(18 ⁺)		
6284.9	(19 ⁻)	887.8 4	100 [‡]	5397.1	(17 ⁻)		
6424.4	(18 ⁻)	461 <i>I</i>		5963.0	(17 ⁻)		
		908 <i>I</i>		5516.8	(16 ⁻)		
6910.0	(19 ⁻)	947 [#] <i>I</i>		5963.0	(17 ⁻)		
6963.8	(20 ⁻)	929 <i>I</i>	100	6034.8	(18 ⁻)		
7236.9	(21 ⁻)	952 <i>I</i>	100 [‡]	6284.9	(19 ⁻)		
7252.4	(22 ⁺)	983 <i>I</i>	100	6269.4	(20 ⁺)		

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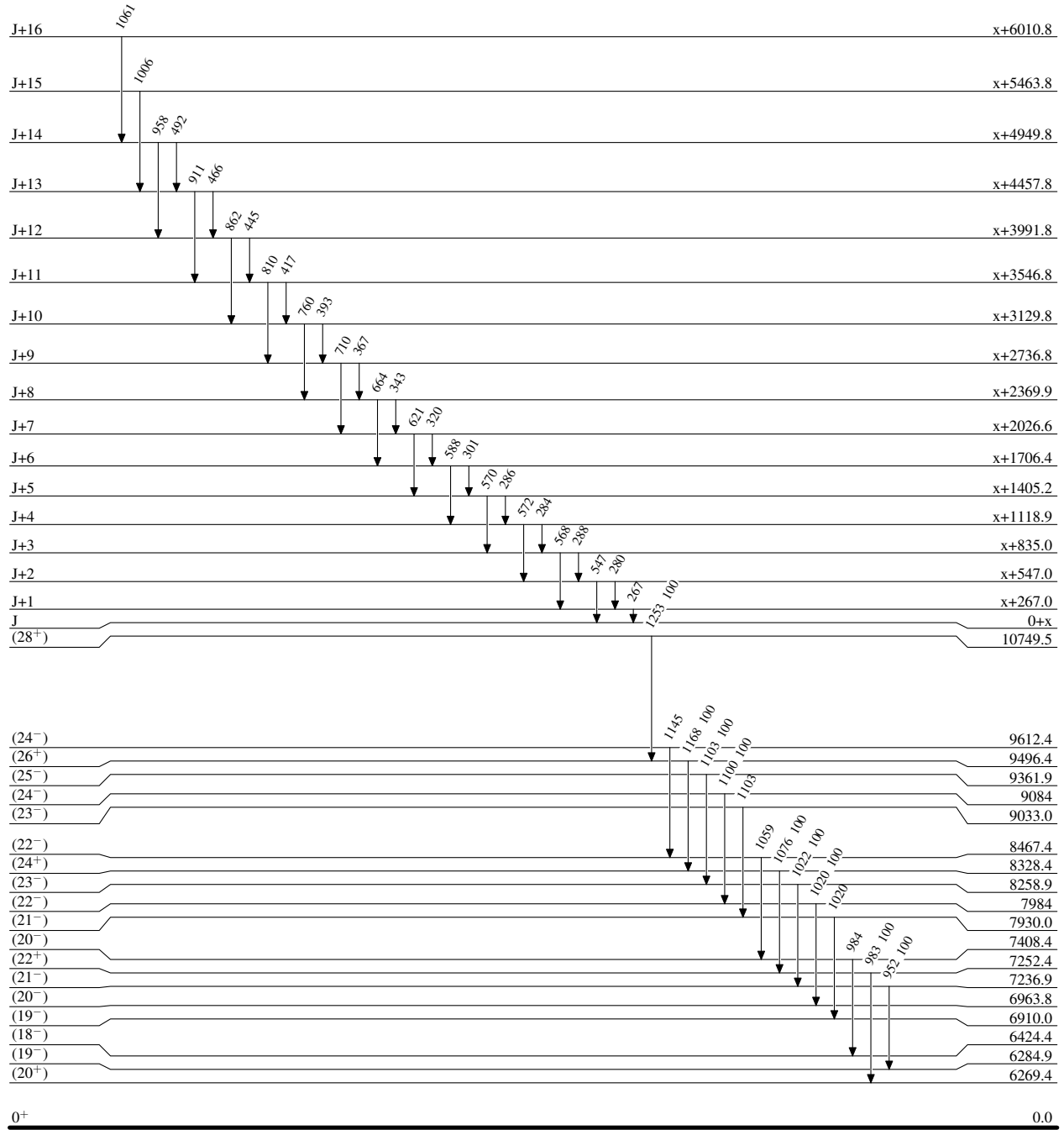
Adopted Levels, Gammas (continued) $\gamma(^{122}\text{Ba})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	I_γ	E_f	J_f^π	$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	E_f	J_f^π
7408.4	(20 ⁻)	984 [#] <i>I</i>		6424.4	(18 ⁻)	x+1706.4	J+6	301 <i>I</i>	x+1405.2	J+5
7930.0	(21 ⁻)	1020 [#] <i>I</i>		6910.0	(19 ⁻)			588 <i>I</i>	x+1118.9	J+4
7984	(22 ⁻)	1020 <i>I</i>	100	6963.8	(20 ⁻)	x+2026.6	J+7	320 <i>I</i>	x+1706.4	J+6
8258.9	(23 ⁻)	1022 <i>I</i>	100 [‡]	7236.9	(21 ⁻)			621 <i>I</i>	x+1405.2	J+5
8328.4	(24 ⁺)	1076 <i>I</i>	100	7252.4	(22 ⁺)	x+2369.9	J+8	343 <i>I</i>	x+2026.6	J+7
8467.4	(22 ⁻)	1059 [#] <i>I</i>		7408.4	(20 ⁻)			664 <i>I</i>	x+1706.4	J+6
9033.0	(23 ⁻)	1103 [#] <i>I</i>		7930.0	(21 ⁻)	x+2736.8	J+9	367 <i>I</i>	x+2369.9	J+8
9084	(24 ⁻)	1100 <i>I</i>	100	7984	(22 ⁻)			710 <i>I</i>	x+2026.6	J+7
9361.9	(25 ⁻)	1103 <i>I</i>	100 [‡]	8258.9	(23 ⁻)	x+3129.8	J+10	393 <i>I</i>	x+2736.8	J+9
9496.4	(26 ⁺)	1168 <i>I</i>	100	8328.4	(24 ⁺)			760 <i>I</i>	x+2369.9	J+8
9612.4	(24 ⁻)	1145 [#] <i>I</i>		8467.4	(22 ⁻)	x+3546.8	J+11	417 <i>I</i>	x+3129.8	J+10
10749.5	(28 ⁺)	1253 <i>I</i>	100	9496.4	(26 ⁺)			810 <i>I</i>	x+2736.8	J+9
x+267.0	J+1	267 <i>I</i>		0+x	J	x+3991.8	J+12	445 <i>I</i>	x+3546.8	J+11
x+547.0	J+2	280 <i>I</i>		x+267.0	J+1			862 <i>I</i>	x+3129.8	J+10
		547 <i>I</i>		0+x	J	x+4457.8	J+13	466 <i>I</i>	x+3991.8	J+12
x+835.0	J+3	288 <i>I</i>		x+547.0	J+2			911 <i>I</i>	x+3546.8	J+11
		568 <i>I</i>		x+267.0	J+1	x+4949.8	J+14	492 <i>I</i>	x+4457.8	J+13
x+1118.9	J+4	284 <i>I</i>		x+835.0	J+3			958 <i>I</i>	x+3991.8	J+12
		572 <i>I</i>		x+547.0	J+2	x+5463.8	J+15	1006 <i>I</i>	x+4457.8	J+13
x+1405.2	J+5	286 <i>I</i>		x+1118.9	J+4	x+6010.8	J+16	1061 <i>I</i>	x+4949.8	J+14
		570 <i>I</i>		x+835.0	J+3					

[†] From (HI,xn γ) and ^{122}La ε decay.[‡] Photon branching=100 is tentative because side branching is expected for band 3.[#] Photon branching was not estimated because no numerical branching data exist for band 4 and band 5.[@] From (HI,xn γ).[&] Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on γ -ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.^a Placement of transition in the level scheme is uncertain.

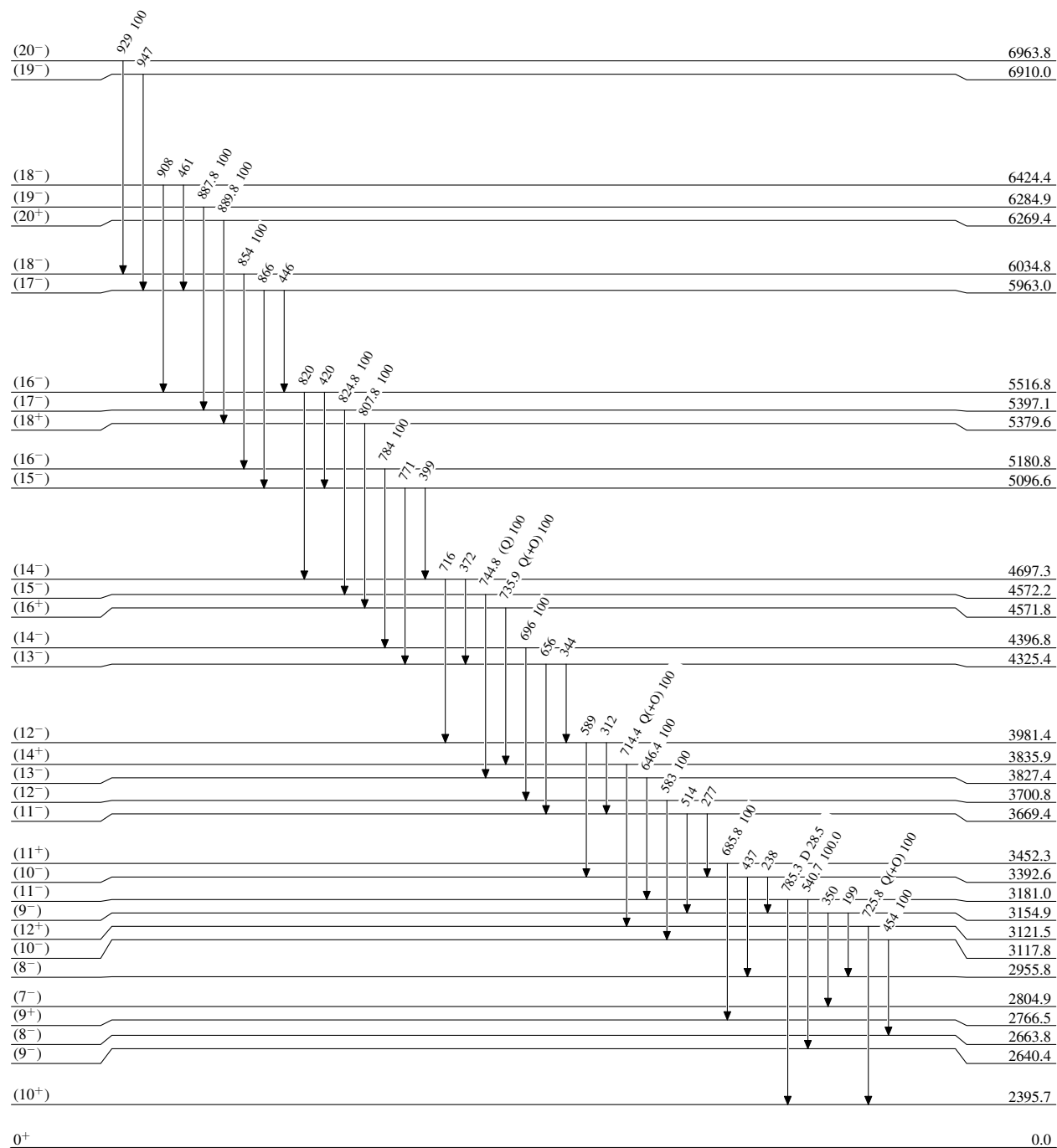
Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level



Adopted Levels, GammasLevel Scheme (continued)

Intensities: Relative photon branching from each level



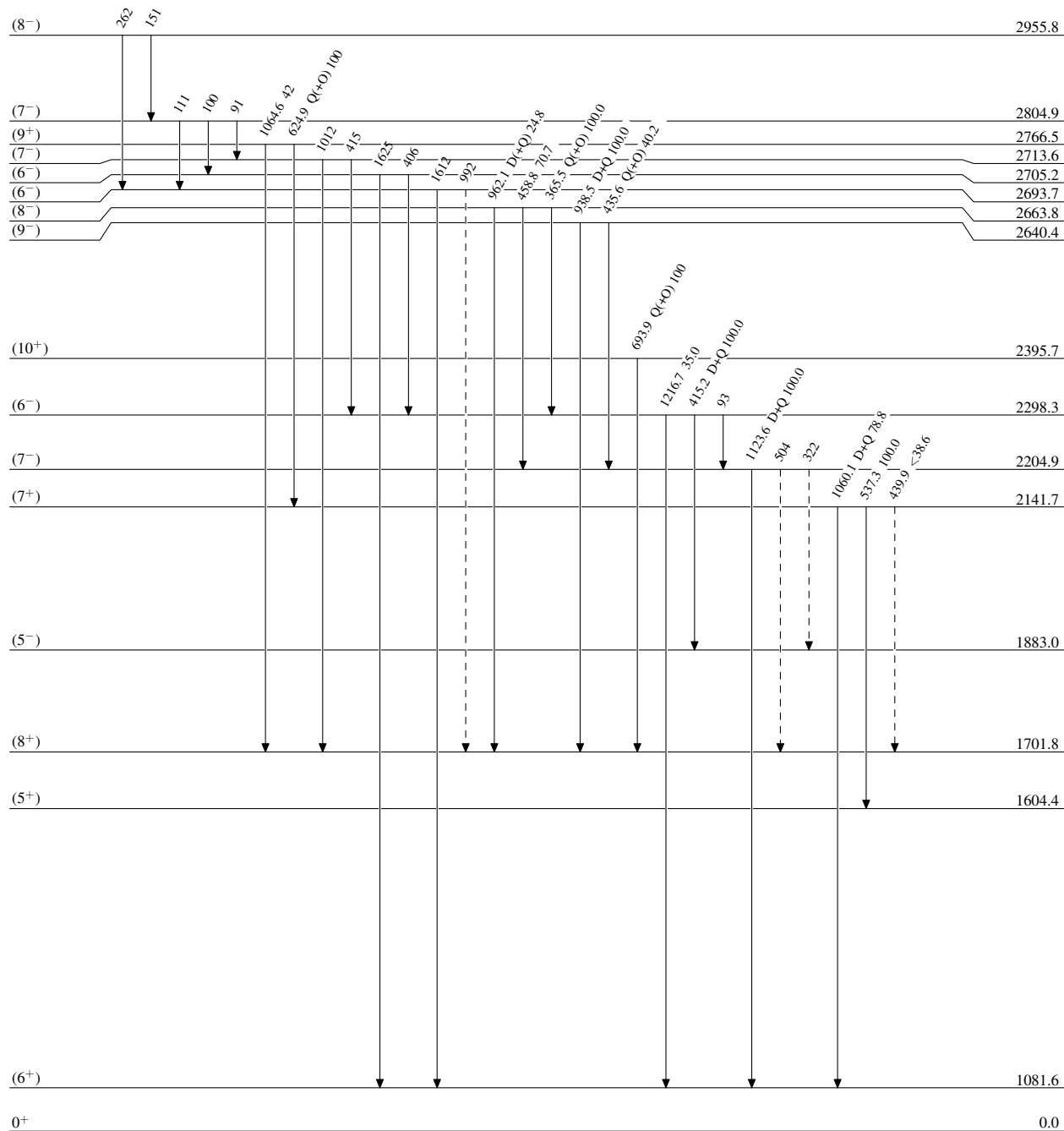
1.95 min 15

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

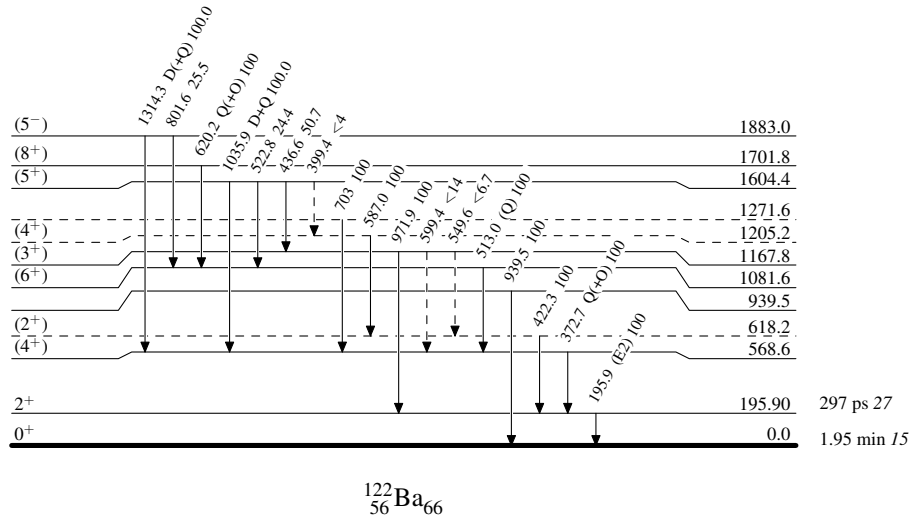
 - - - - - $\rightarrow$ γ Decay (Uncertain)


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain) $^{122}_{56}\text{Ba}_{66}$

Adopted Levels, Gammas

Band(A): Band 1, g.s.
band, Crossing at $h^{\circ}v \approx$
360 keV due to alignment
of a pair of $h_{11/2}$
protons

(28 ⁺)	10749.5
	1253
(26 ⁺)	9496.4
	1168
(24 ⁺)	8328.4
	1076
(22 ⁺)	7252.4
	983
(20 ⁺)	6269.4
	890
(18 ⁺)	5379.6
	808
(16 ⁺)	4571.8
	736
(14 ⁺)	3835.9
	714
(12 ⁺)	3121.5
	726
(10 ⁺)	2395.7
	694
(8 ⁺)	1701.8
	620
(6 ⁺)	1081.6
	513
(4 ⁺)	568.6
	373
2 ⁺	195.90
	196
0 ⁺	0.0

Band(B): Band 2,
configuration= $\pi(1/2[550])$
 $\pi(3/2[422] + 1/2[420])$,
 $\alpha=0$

(24 ⁻)	9084
	1100
(22 ⁻)	7984
	1020
(20 ⁻)	6963.8
	929
(18 ⁻)	6034.8
	854
(16 ⁻)	5180.8
	784
(14 ⁻)	4396.8
	696
(12 ⁻)	3700.8
	583
(10 ⁻)	3117.8
	454
(8 ⁻)	2663.8
	366
(6 ⁻)	2298.3

Band(C): Band 3,
configuration= $\pi(1/2[550])$
 $\pi(3/2[422] + 1/2[420])$,
 $\alpha=1$

(25 ⁻)	9361.9
	1103
(23 ⁻)	8258.9
	1022
(21 ⁻)	7236.9
	952
(19 ⁻)	6284.9
	888
(17 ⁻)	5397.1
	825
(15 ⁻)	4572.2
	745
(13 ⁻)	3827.4
	646
(11 ⁻)	3181.0
	541
(9 ⁻)	2640.4
	436
(7 ⁻)	2204.9
	322
(5 ⁻)	1883.0

Band(D): Band 4,
configuration= $\pi 9/2[404]$
 $\pi 1/2[550]$, $\alpha=0$

(24 ⁻)	9612.4
	1145
(22 ⁻)	8467.4
	1059
(20 ⁻)	7408.4
	984
(18 ⁻)	6424.4
	908
(16 ⁻)	5516.8
	820
(14 ⁻)	4697.3
	716
(12 ⁻)	3981.4
	589
(10 ⁻)	3392.6
	437
(8 ⁻)	2955.8
	262
(6 ⁻)	2693.7

Band(E): Band 5,
configuration= $\pi 9/2[404]$
 $\pi 1/2[550]$, $\alpha=1$

(23 ⁻)	9033.0
	1103
(21 ⁻)	7930.0
	1020
(19 ⁻)	6910.0
	947
(17 ⁻)	5963.0
	866
(15 ⁻)	5096.6
	771
(13 ⁻)	4325.4
	656
(11 ⁻)	3669.4
	514
(9 ⁻)	3154.9
	350
(7 ⁻)	2804.9

Band(F): Band 6, configuration= $\nu 7/2[523]\nu(5/2[402]$ and/or $5/2[413]$)

J+16	x+6010.8
J+15	1061 x+5463.8
J+14	1006 x+4949.8
J+13	492 958 x+4457.8
J+12	466 x+3991.8
J+11	445 862 x+3546.8
J+10	417 x+3129.8
J+9	393 760 x+2736.8
J+8	367 x+2369.9
J+7	343 x+2026.6
J+6	320 664 x+1706.4
J+5	301 x+1405.2
J+4	286 588 x+1118.9
J+3	284 x+835.0
J+2	288 572 x+547.0
J+1	280 547 x+267.0
J	267 0+x

Adopted Levels, Gammas (continued)

